APPROACH – ANSWER: G. S. MAINS MOCK TEST - 2067 (2023)

Answer all the questions in NOT MORE THAN 200 WORDS each. Content of the answers is more important than its length. All questions carry equal marks. ***12.5X20=250***

1. ***Explaining the concept of multi-dimensional poverty, state the measures which have been taken to address this problem in India.***

Approach:

- Write about the concept of multi-dimensional poverty.
- State the measures which have been taken to reduce multidimensional poverty in India.
- Conclude accordingly.

Answer:

Multidimensional poverty, going beyond the income criteria, measures poverty as an acute deprivation in three key areas – **living standards, education and healthcare,** that a poor person simultaneously faces. Recently, the NITI Aayog has released the '**National Multidimensional Poverty Index: Baseline Report and Dashboard**'.

The Multi-dimensionality Poverty Index (MPI) serves as a better model than income criteria to identify poor persons due to the following reasons:

- **Multidimensional approach**: The MPI takes advantage of the availability of multipurpose household surveys, which allow data on different dimensions to be drawn from the same survey. They identify the people who experience overlapping deprivations.
- **Better comparison:** The MPI can show the prevalence of multidimensional poverty across different regions, ethnic groups or any other population sub-group.

In this context, the following steps have been taken to help reduce multidimensional poverty in India:

- **Child mortality:**
  - **Janani Suraksha Yojana** (JSY) **and Janani Shishu Suraksha Karyakaram** (JSSK) have been launched to **promote institutional deliveries** through cash incentives.
  - **India Newborn Action Plan (INAP)** was launched in 2014 to ensure attainment of the goals of "Single Digit Neonatal Mortality Rate" and "Single Digit Stillbirth Rate," by 2030.
  - The **Reproductive, Maternal, Child and Adolescent Health programme** (**RMNCH+A**) encompasses all interventions aimed at reproductive, maternal, newborn, child, and adolescent health under a broad umbrella.
  - **Universal Immunization Programme (UIP)** was launched to provide vaccination to children against life threatening diseases. Similarly, "**Mission Indradhanush and Intensified Mission Indradhanush**" have been launched to immunize children who are either unvaccinated or partially vaccinated.
  - **Pradhan Mantri Surakshit Matritva Abhiyan (PMSMA)** provides fixed-day assured, comprehensive and quality antenatal care universally to all pregnant women.
  - **Rashtriya Bal Swasthya Karyakram (RBSK)** provides comprehensive care to all the children in the age group of 0-18 years in the community.
- **Nutrition:**

    - Various schemes like the **National Nutrition Mission, PM- POSHAN (Mid Day Meal) scheme etc.** have been launched with the aim of tackling the malnutrition problem prevalent in India.
    - **Nutrition Rehabilitation Centres (NRCs)** have been set up at public health facilities to treat and manage the children with Severe Acute Malnutrition (SAM).
    - **Iron and Folic Acid (IFA) supplementation** for prevention of anaemia among the vulnerable age groups and home visits by ASHAs to promote exclusive breastfeeding.
    - **Health and nutrition education** through Information, Education & Communication (IEC) and Behavior Change Communication (BCC) is being carried out.
- **Education:**
    - Various schemes like Sarva Shiksha Abhiyan, Mahila Samakhya Programme, Scheme of Vocational Education, scholarships schemes for vulnerable sections, various fellowships etc. are being provided.
    - **The New Education Policy 2020** has been launched to ensure 'universal access at all levels of school education'.
- **Living Standards**:
    - **Swachha Bharat Abhiyan** aims to ensure cleanliness and sanitation.
    - **Pradhan Mantri Awas Yojana** is aimed at providing housing for all.
    - **Swajal Sheme** has been launched to provide clean drinking water.
    - **PM Ujjawala Yojana** has been launched to provide clean cooking fuel.
    - **Under Pradhan Mantri Sahaj Bijli Har Ghar Yojna (SAUBHAGYA)**, electricity connections were started for BPL families for free and other families at concessional rates.

Apart from the above mentioned initiatives, the government should focus on accelerating economic growth, agricultural growth, human resource development and infrastructure development, implementation of Universal Basic Income, capacity development of government officials etc., which will help India achieve its **Sustainable Development Goal 1 i.e.** end poverty in all its forms everywhere.

2. Discuss the benefits of commercial coal mining in India and challenges associated with it.

Approach:

- Give a brief introduction about commercial coal mining.
- Discuss the benefits of commercial coal mining in India.
- Discuss the challenges associated.
- Conclude accordingly.

Answer:

India has recently shifted to the commercial coal mining regime. Commercial coal mining allows the private sector to mine coal commercially without placing any end-use restrictions. Under this, coal mining blocks are granted through a competitive bidding process. Now, 100% foreign direct investment (FDI) through automatic rule is allowed in coal mining activities, including associated processing infrastructure. Associated processing infrastructure includes washery and facilities for crushing and coal handling

Benefits from commercial coal mining:

- **Reducing India's dependence on import:** India meets a fifth of its annual requirement of coal through imports. Commercial coal mining is expected to reduce this bill by at least 1/3rd.
- **Modernizing the coal sector:** New mining majors will set new benchmarks in terms of mechanization, automation, mining practices etc.
- **Development of states:** The entire revenue from the auction of coal mines would accrue to the coal bearing states. This will incentivize them to utilize the revenue accrued for the growth and development of backward areas.
    - In captive coal mining, companies were not required to pay royalty to states as mined coal was meant for their own end use.

- **Enhancing the productivity of the coal sector:** Opening the sector to private players and foreign investments will end the monopoly of Coal India Limited and bring in competition. Also, earlier captive coal mining entities had no incentive to enhance their production beyond their own needs.
- **Development of aspirational districts:** Most of the mines auctioned under new norms are in aspirational districts. These mines would create employment as well as other economic opportunities in the area.

Challenges associated:

- **Broad eligibility criteria:** As the new regime is allowing those who have no previous mining experience, they may turn out to be non-serious bidder who may use coal mines as assets to leverage in the market without any intention of actually mining them as happened during 2000s.
- **Overexploitation of resources:** As under the new regime there is no restriction of end use, it might lead to more and more coal mining for profit in a shorter period of time.
- **Concerns of state governments:** States like Jharkhand are raising concerns that the new regime will lead to destruction of vital forest cover and its tribal communities will be displaced.
- **Deep pockets and risk management capabilities are needed:** After winning the coal auction, rehabilitation and resettlement needs to be managed. Very few firms in India today have the financial and risk management capabilities to go through all of this.

To make the new commercial coal regime a success, few steps such as addressing the concerns of the state regarding their revenue share, enacting sustainable coal mining code for removing overlapping jurisdictions of multiple bodies etc. need to be taken.

3. Highlight the significance of the Mega Food Park Scheme. Also, discuss the associated challenges.

Approach:

- Give a brief introduction about Mega Food Park (MFP) scheme.
- Bring out significance of the scheme.
- Discuss the associated challenges.
- Conclude by suggesting remedial measures.

Answer:

Introduced in 2008, the Mega Food Park (MFP) Scheme aims at providing modern food processing infrastructure along the integrated value chain from **farm to market** with a **cluster-based approach**. It operates in **hub and spoke model**, comprising Collection Centers (CCs) and Primary Processing Centres (PPCs) as spoke and a Central Processing Centre (CPC) as hub. It is now a component of Pradhan Mantri Kisan Sampada Yojna.

As of August 2021, Ministry of Food Processing Industries has accorded final approval to 38 Mega Food Parks and in-principle approval to three Mega Food Parks in the country. Out of these, 22 Mega Food Park projects have been made operational and 19 projects are under various stages of implementation.

Significance of MFP scheme:

- **Creation of infrastructure:** It includes creation of infrastructure for primary processing and storage near the farm in the form of PPCs and CCs and common facilities and enabling infrastructure like roads, electricity, water etc. at CPC.
- **Integrated value chain:** The scheme intends to facilitate establishment of an integrated value chain, with food processing at the core and supported by requisite forward and backward linkages.
- **Maximizes productivity:** The scheme aims to bring together farmers, processors and retailers and link agricultural production to the market to ensure maximization of value addition, minimization wastages and improving farmers income.

- **Value addition:** The scheme will boost value addition in 22 perishables items like mango, banana, apple, pineapple, carrot, cauliflower, beans etc identified by the Ministry to supplement the income of farmers.

Challenges associated with MFP scheme:

- **Procedural delays:** There is delay in statutory clearance from state governments/ agencies. The approach of the scheme is basically one size fits all and the scheme has not been able to attract investors with different investment requirements.
- **Issues in credit availability:** The units in the MFP cannot own land and, therefore, they cannot use the land as collateral to take loans from banks.
- **Lack of human resources:** Skill level of workers and availability of skilled workforce is a cause of concern.
- **Ambitious targets:** The timeline of 30 months to make the park operational is too tight and it does not take into account the contingencies. Sometimes there are challenges created due to change in DPR during implementation of the project.

Given the challenges pertaining to the scheme, there is a need for review of the scheme parameters with a view to ensure flexibility in terms of the requirement of different clusters. The role of state governments must be enhanced in terms of land allocation and development of food parks. Special incentive package needs to be given to state governments to promote such projects.

In this context, cold chain and food parks have been declared as **infrastructure** to ensure greater flow of funds to the sector on easier terms. Also, the recently launched **National Food Processing Policy** is targeting to increase the investment in the sector by six times by 2035.

4. *Identify various impediments faced by the livestock sector in India. Also, suggest measures to remove these impediments.*

Approach:

- Give a brief account of the livestock sector of India.
- Discuss various impediments faced by livestock sector in India.
- Suggest measures to remove these impediments.
- Conclude accordingly.

Answer:

According to the 20th Livestock Census, India has the world's highest livestock population. Livestock sector provides livelihood to around two-third of rural community and about 8.8% of the population in India. The sector contributes to 4.11% of GDP and 25.6% of total agriculture GDP.

Impediments faced by livestock sector in India:

- **Low productivity:** The productivity of indigenous breeds is extremely low as compared to the foreign varieties, making them a burden on farmers rather than assets.
- **High incidence of diseases:** With improvement in the quality of livestock through cross-breeding programs, their susceptibility to various diseases including **exotic diseases** such as haemorrhagic septicaemia, swine fever, etc. has increased, leading to economic losses to the farmer.
- **Inadequate infrastructure:**
  - The number of **veterinary institutions** is not up to the required standards.
  - Shortage of **vaccines** and **cold storage** facilities.
  - Inadequate attention towards **extension services.**
  - Lack of **institutional credit.**
  - Livestock market remains largely **informal**.
- **Shortage of feed and fodder:** Hardly 5% of the cropped area in India is utilized to grow fodder and area under permanent pastures/grasslands (3.3%) is continuously decreasing.
- **Lack of inclusivity:** Unconventional sources of milk such as camel, yak, etc., still fail to be included comprehensively within policies and programmes.

- **Globalisation:** Unfavourable food safety and quality norms for India hinders potential export growth in the Indian livestock sector.

Thus, following measures can be taken to remove the impediments to the sector:

- **Strengthening of linkages** between production and markets through institutions such as co-operatives, producers' associations, and contract farming.
- Promoting **livestock farm automation systems** to save time, reduce labour requirements, and improve product quality, increase production, efficiency, accuracy, and safety.
- Explore the possibility of **availing more funds** under other Schemes such as Rashtriya Krishi Vikas Yojana (RKVY), Rural Infrastructure Development Fund (RIDF) including dovetailing with MPLAD funds etc. so as to cater adequate veterinary health services in States / UT.
- Establishing a network of Mobile Veterinary Clinic (MVC) to provide **doorstep delivery of veterinary services** specifically for remote / border and inaccessible areas.
- Increase the present **number of Veterinary Colleges/Universities** in order to reduce the shortage of trained manpower in veterinary services.
- Investments made by private companies, cooperative societies etc. can be used in augmenting **veterinary infrastructure**. Example, Mobile Dispensaries in Gujarat.
- **One-Stop Centre** for solutions to livestock issues and dissemination of information to the remotest areas of the country can ensure eradication of Infectious diseases.

Livestock provides not only a hedge against improper agriculture but also provides an opportunity to earn an additional income. Therefore, taking the above measures will help boost the potential of the sector and realise the goal of doubling the farmers' income.

5. ***In context of the recently launched National Monetisation Pipeline, elaborate on the concept of asset monetisation. Also, discuss its significance for India.***

Approach:

- Define asset monetisation, in light of the recently launched National Monetisation Pipeline.
- Mention its significance in the context of India.
- Conclude accordingly.

Answer:

Asset monetisation, also commonly referred to as asset or capital recycling, is a widely used business practice globally. This consists of limited period transfer of performing assets (or disposing of non-strategic / underperforming assets) owned by the government to a private sector entity to unlock "idle" capital and reinvesting it in other assets or projects that deliver improved or additional benefits. It is based on the philosophy of Creation through Monetisation.

The concept of asset monetisation is structured around:

- Monetising **assets with high appetite among investors**; and **reinvesting proceeds** into assets/services that citizens desire.
- New asset creation **without necessarily increasing debt levels or taxes**.
- **Efficiency** gains, **competition** and improved **performance monitoring**
- Enhancing **investment opportunities, depth and liquidity in infrastructure** as an asset class.

Recently, the government launched the **National Monetisation Pipeline (NMP).** It estimates aggregate monetisation potential of Rs 6.0 lakh crores through core assets of the Central Government, over a four-year period (FY 2022 to FY 2025).

Significance of asset monetisation for India:

- **Financing of infrastructure investments:** National Infrastructure Pipeline (NIP) has emphasized on innovative and alternate mechanisms, such as asset monetisation, for generating additional capital from mature brownfield assets.
- **Private sector expertise:** Asset monetisation will help tap the private sector efficiencies in operations and management of infrastructure.

- **Brownfield assets**: India holds one of the largest brownfield stocks of fixed assets in the world. Asset monetisation will help in generating adequate investments from these assets.
  - Increased appetite for brownfield assets is evidenced by the flow of private and institutional capital into sectors such as roads, power and telecom.
  - Reduced appetite for greenfield assets: over the last few years there has been reduced interest of private sector and debt financiers for greenfield infrastructure. Asset monetisation, therefore strives to tilt the axis from greenfield to brownfield models.
- **REITs and InvITs**: New models like Infrastructure Investment Trusts and Real Estate Investment Trusts will enable not just financial and strategic investors but also common people to participate in this asset class thereby opening new avenues for investment.
- **Social sector priorities:** Funds, so received by the public authority, can be reinvested in new infrastructure or deployed for fulfilment of other social sector priorities like health, food security, education, etc.
- **Economic stimuli and fiscal headroom:** The need for adoption of such alternative mechanisms has only been further pronounced in the wake of COVID-19. Asset monetisation will provide the government with additional revenue to tackle such crisis situations.

However, in order to give the needed fillip to the monetization initiative, following three aspects need concerted efforts and interventions. Firstly, a relentless focus on implementation; secondly developing brownfield models and frameworks and lastly, driving states and partnering with them in undertaking monetisation in a structured manner.

6. Explain the significance of backward and forward linkages in the Food Processing Industry. Also, discuss the challenges in establishing robust linkages in India.

Approach:

- Start by explaining the backward and forward linkages in the food processing industry.
- Discuss their importance.
- Highlight associated challenges.
- Conclude accordingly.

Answer:

Linkages enhance the capability of the food processing industry to generate demand for the products of/in the other industries. They are mainly of two types:

- **Backward Linkages**: These linkages establish the connectivity of the **food processing industry with sources of raw material supply**. For example, supply of raw material like tomatoes to a ketchup manufacturer.
- **Forward Linkages:** These linkages establish the connectivity of the food **processing industry with the markets** through a distribution network consisting of physical infra like storages, road and rail network etc.

Significance of backward and forward linkages

- Direct link between farmers and food processors encourages and enables farmers to **grow products of appropriate quality**.
- Removal of intermediaries helps the farmers fetch **appropriate and remunerative return** for their produce especially the marginal and medium farmers.
- Establishment of cold storage facilities help to **reduce the food wastage** especially of perishable products with low shelf life like fruits, vegetables, dairy products etc.
- Backward linkages ensure **timely accessibility to raw materials and storage facilities** for agri produce.
- Similarly, connectivity with markets through distribution networks ensures **timely delivery of food products to the consumer markets**.
- Maintaining high quality of products and creation of better infrastructure results in **cost saving and enhanced efficiency**.

- These links among farmers, industry and consumers provide a **level playing field for all stakeholders** and **enhance competitiveness**.
- It also helps to **improve hygiene and food safety standards** leading to greater acceptability of processed food domestically and in the international market.

Challenges in establishing robust linkages

- Due to **fragmented land holdings**, the marketable surplus is small and dispersed which makes it difficult for industry to timely procure quality raw materials.
- **High seasonality of raw material production** limits the effective utilisation of linkages.
- **Large number of intermediaries and poor infrastructure facilities** like cold storage, transport facilities, electricity etc. hinders backward and forward integration.
- **Highly fragmented and unorganised nature** of food processing industry limits the capability to ensure an efficient supply chain across the industry.
- **Inadequacy of information with farmers and small processors and substandard levels of processing** leads to compromise with the quality of products.
- **Multiplicity of legislation** governing the food processing sector leads to contradictions in specifications, conflicting approach, lack of co-ordination and administrative delays.
- **Anomalies in domestic food laws** with international food safety standards and **under developed food testing network.**

To address these challenges, the government has launched the **'Scheme for Creation of Backward and Forward Linkages'** for effective and seamless backward and forward integration by plugging the gaps in the supply chain. Under the scheme, financial assistance is provided for setting up of primary processing centers/ collection centers at farm gate and modern retail outlets at the front end. Furthermore, the government organised **Mega International Food Submit** and **World Food India Hackathon** to design solutions by leveraging technology for various problems in the food processing sector.

7. ***Highlight the issues related to agricultural marketing in India. Also, list the steps that have been taken in this regard.***

Approach:

- Introduce by writing about agricultural marketing in India.
- Discuss the issues related to agricultural marketing in India.
- Suggest steps that have been taken to address these issues.
- Conclude accordingly.

Answer:

Agricultural marketing is a **process which starts with a decision to produce a saleable farm commodity** and **involves all aspects of market structure**, both functional and institutional, based on technical and economic considerations and includes pre and post-harvest operations, assembling, grading, storage, transportation and distribution.

Issues related to agricultural marketing in India

- **Institutional Issues:**
    - **Licensing barriers:** The compulsory requirement of owning a shop/godown for getting a license as commission agents/traders creates a major entry barrier in existing APMCs for new entrepreneurs.
    - **High incidence of market charges**: APMCs are authorized to collect market fee ranging between 0.5% to 2.0% of the sale value of the produce. Further, other charges, such as, purchase tax, weighment charges etc. are also required to be paid. In some states, this works out to **total charges as high as 15 %.**
    - **Absence of standardized grading mechanism before sale:** It hinders farmers from fetching the prices commensurate with the quality of their produce.

- **Infrastructural Issues:**
  - **Poor infrastructure in agricultural markets**: Studies indicate that covered and open auction platforms exist only in two-thirds of the regulated markets, while only one-fourth of the markets have common drying yards. Cold storage units exist in less than one tenth of the markets and grading facilities in less than one-third of the markets.
  - **Poor economic viability of projects**: Agriculture marketing infrastructure projects have a long gestation period. The seasonality and aggregation of small surpluses of agricultural produce further affects the economic viability of the projects, which deters investments.
- **Market information system issues:**
  - **Lag in demand signals**: Absence of efficient real-time informational channels create a lag in demand signals. This has resulted in farmers following price trends as indicators to supply.
  - **Limited information channels and content:** The current information dissemination systems, (like local newspapers and APMC display boards) provide information only on prices of major commodities, are far away from farmer's location and generally not available in local languages.

Steps taken to address these issues

- **Creating a Model APMC Act, 2003**: It aimed to facilitate amendment of the existing Rules to address the aforementioned issues. So far, only sixteen States have amended their Act and only six states have notified the amended Rules.
- **Consumer/Farmer Market (Direct Sale by the Producer):** Direct marketing by farmers to the consumers has been experimented in the country at the State level. For example, Apni Mandi of Punjab, Rythu Bazaars in Andhra Pradesh, Shetkari Bazar in Maharashtra etc.
- **AGMARKNET**: It is a G2C e-governance portal that caters to the needs of various stakeholders such as farmers, industry, policy makers and academic institutions by providing agricultural marketing related information from a single window.
- **Gramin Agricultural Markets (GrAMs):** Efforts are being made to develop and upgrade existing 22,000 rural haats (Rural Primary Markets) into GrAMs. These markets will have several features like:
  - **Physically strengthened infrastructure** enabled through MGNREGS and other schemes along with better road linkages with habitations.
  - GrAMs will be **linked to e-NAM and will remain outside the APMC Act regulation.**
- **Initiatives like Kisan Rail** for movement of vegetables, fruits and other perishables. It aims to ensure their safe, reliable and fast transportation which will aid in better price realisation for the farmers.
- **Scheme for Formation and Promotion of Farmer Produce Organizations (FPOs):** The scheme aims to create **10,000 FPOs in five years period from 2019-20 to 2023-24** and also provide handholding support to each FPO.

Marketing facilitates and improves the sale of agricultural products. The value of these products is factored by the demand and supply status, which in turn is impacted by the marketed volume and the asking price. Also, a well-developed marketing infrastructure and efficient marketing system **promote competitive trade** resulting in better price realization for the farmer.

8. ***What is Swiss Challenge Model? Discuss the advantages and problems associated with this model.***

Approach:

- Introduce the answer by explaining the Swiss challenge model.
- Highlight its advantages.
- Discuss problems associated with this model.
- Conclude accordingly

Answer:

The Swiss challenge model means a method of public procurement in which an **unsolicited proposal is received** by a public authority for a project that predominantly involves uniqueness and specificity of design, technology and intellectual property rights. The government then examines the proposal and if the proposal belongs to the declared policy of priorities, then it **may invite competing counter proposals** from third parties. In the event of a better proposal being received, the **original proponent is given the opportunity to modify the original proposa**l. Finally, the proponent with the best plan is awarded the contract.

In a **2009 ruling**, the Supreme Court had approved the Swiss Challenge method for award of contracts. Further, respective state governments were encouraged to draft guidelines for procurement using the Swiss Challenge method. For example, Maharashtra and Karnataka have adopted their own policy guidelines.

Advantages of Swiss Challenge Model

- **Promotes competition**: It allows the project to be put for competitive bidding and counter-bidding so as to realize the optimum cost.
- **Enhances efficiency**: It provides time and cost saving on pre project activities and feasibility studies for the public authority vis-à-vis other Public Private Partnership (PPP) models.
- **Professionalism**: With proper identification of timelines, risks and their allocation, it becomes easier for the public authority as the project preparation is done in a more professional manner and in turn reducing red-tapism.
- **Creativity**: Since this model allows the prospective bidders to analyse the design submitted by their competitors and come out with better design, it promotes creative designing and project execution.
- **Equitability:** Useful for the governments that have **limited technical and financial capacity** to develop projects.

Problems associated with Swiss Challenge Model

- **Issue of Transparency**: The biggest concerns are the lack of sufficient transparency and inadequate competition, while dealing with unsolicited proposals and thus it becomes difficult to fix accountability.
- **Crony capitalism**: This method could breed crony capitalism by allowing companies to employ dubious means to bag projects.
- **Bidding asymmetry**: There is asymmetry in bidding time given to bidders to prepare counter proposals in relation to time taken by originator for preparation.
- **Issue of legal validity**: There are no adequate regulatory and legal frameworks. Further, there is a problem of proper legal validity of using this method when a counter proposal contains different specifications than the original proposal.
- **Difficult to measure the monetary value** : It is very difficult to measure monetary value of an unsolicited proposal when a contract or project is not given to the original proponent.

However, these issues can be addressed by instituting a national policy framework for the Swiss Challenge method. There should be wider participation and greater flexibility to promote innovation at the pre-proposal stage and sufficient time for counter-bidders to respond at the post-proposal stage.

9. Highlighting the importance of investment in road infrastructure for India's economic development, discuss the initiatives taken by the government in recent times in this regard.

Approach:

- Briefly discuss the share of road transportation in the overall transport sector.
- Highlight the importance of investing in road infrastructure for India's economic development.
- Mention the steps taken by the government to improve India's road infrastructure.
- Conclude accordingly.

Answer:

India has the second-largest road network in the world, spanning a total of around **5.89 million kilometres (kms)**. This road network **transports approximately 64.5% of all goods** in the country and **90% of India's total passenger** traffic uses the road network to commute. Road transportation has gradually increased over the years with improvement in connectivity between cities, towns and villages in the country.

Importance of investment in road infrastructure for India's economic development:

- **Multiplier effect on the economy:** Investment in road infrastructure has **a force multiplier effect on the economy** that provides a fillip to other sectors of the economy, including steel, cement, auto, real estate and results in creation of **indirect employment.**
- **Last mile connectivity**: Road transportation is a **cost-effective and most convenient mode** of transportation in India both for freight and passengers, as it has a high penetration level with door-to-door delivery.
- **Socio-economic benefits:** Road infrastructure is widely recognized as a potent means of **socio-economic integration** and key to India's **productivity and competitiveness** of sectors such as agriculture and manufacturing.
- **Improvement in bilateral and multilateral relations: Better border road infrastructure** would ensure greater manoeuvrability and also boost trade with neighbouring countries.

Major initiatives taken by the government to improve India's road infrastructure:

- **PM Gati Shakti-National Master Plan:** It will incorporate the infrastructure schemes of various Ministries and State Governments. This will help in ensuring integrated planning and coordinated implementation of infrastructure connectivity projects. For instance, **Bharatmala Pariyojana** focuses on enhancing effectiveness of already built infrastructure, multi–modal integration, bridging infrastructure gaps for seamless movement and integrating national and economic Corridors**.**
- **National infrastructure pipeline:** The government has allocated Rs. 111 lakh crore (US$ 1.4 trillion) under the National Infrastructure Pipeline for FY 2019-25. The roads sector is likely to account for 18% capital expenditure over FY 2019-25.
- **National Highway Development Projects**: Some of the key projects are the Golden Quadrilateral project, the North-South and East-West Corridors, road connectivity of major ports of the country to the national highways etc. Further, the National Highways Authority of India (NHAI) has decided to deploy a Network Survey Vehicle (NSV) to enhance the quality of the national highways.
- **Foreign Direct Investment**: In a bid to facilitate private funding, **100 percent foreign direct investment is permitted in the road sector.**
- **NHAI InvIT:** As a part of the National Monetisation Pipeline, the NHAI has launched its Infrastructure Investment Trust (InvIT) to monetise national highway projects in India providing revenue source for road infrastructure investment.

Despite the initiatives, there are certain constraints in the sector such as limited private sector participation in development of roads and highways, fund constraints, delays in land acquisition etc. In this context, there is a need for a greater budgetary commitment towards strengthening of the roadway infrastructure, timely land acquisition, and attracting private investment opportunities in the sector.

10. The burden of poverty weighs down heavier on women in India than on the opposite sex. In this context, discuss the causes of poverty among women and steps taken to address it.

Approach:

- Introduce by substantiating the relevant facts ascertaining the burden of poverty on women.
- Discuss the causes of poverty among women.
- Highlight the steps taken in this regard.
- Conclude accordingly.

Answer:

Gender inequality is one of the most pervasive forms of inequality. Across India, gender inequality results in unequal opportunities, and while it impacts the lives of both genders, statistically it is girls and women that are the most disadvantaged. For instance, **according to the Global Gender Gap**

report 2021, the estimated **earned income of women in India is only one-fifth that of men's**, which severely undermines their purchasing power, devalues their work and signifies that women are more likely to live in poverty.

Causes of poverty among women in India include:

- **Unpaid care work:** Women bear a disproportionate share of the work and responsibility of feeding and caring for family members through unpaid household work. For instance, according to an **Oxfam report in 2019, women in India spend around five hours a day on unpaid care work** while men devote a mere half an hour on average, thus contributing to women's time poverty and loss in well- being.
- **Low female labour force participation rate:** Social stigma, violence against women in public places, risk of sexual assault, unsafe work environment etc. discourage Indian women from entering the labor market, thereby resulting in continuous fall in the Female Labour Force Participation Rate (FLFPR) over the last three decades.
    - According to the **World Bank, in 1990, India's FLFP was 30.3 per cent and by 2019, it had declined to 20.5 per cent.**
- **Gender gaps in nutrition, education and health**: The gender gaps in nutrition, education and health are greater especially in poorer households, thereby putting them at a disadvantage.
- **Low wages**: According to an **Oxfam report**, **women still receive 34% less wages** than their male counterparts for the same work. This is a disincentive for working women as well as those who are looking to enter the workforce.
- **Lack of decent work conditions**: Most women in India are employed in the informal economy, where they are less likely to have employment contracts, legal rights and social protection, and are often not paid enough to escape poverty.

Steps taken by the government to reduce the poverty among women are:

- **Legislative measures**: The government has enacted various legislations to promote socio-economic empowerment of women such as the **Equal Remuneration Act, 1976, Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013, Maternity Benefit (Amendment) Act, 2017** raising maternity leave and providing crèche facility in work place etc.
- **Schemes to address gender inequality**: **Beti Bachao Beti Padhao, One Stop Centre (OSC) Scheme, Ujjawala Scheme** are some of the initiatives launched by the government to address the issue of gender inequality.
- **National Mission for Empowerment of Women (NMEW):** It aims to strengthen the overall processes that promote the all-round development of women.
- **Rashtriya Mahila Kosh (RMK):** It aims to provide micro-finance services to bring about the socio-economic upliftment of poor women.
- **Support to Training and Employment Program for Women (STEP):** It aims to ensure sustainable employment and income generation for marginalised and asset-less rural and urban poor women across the country.
- **Working Women Hostels:** It aims to ensure safe accommodation for working women away from their place of residence.

Supporting women to have access to quality and decent work and improve their livelihoods is vital for attaining women's rights, reducing gender poverty and attaining the broader development goals.

11. Bring out the benefits of e-technology for the Indian farmers. Also, highlight the steps taken by the government in this context.

Approach:

- Briefly highlight the importance of e-technology for agriculture.
- Mention the benefits of e-technology for the Indian farmers.
- Discuss the steps taken by the government in this regard.
- Conclude accordingly.

Answer:

Agriculture in India is the core sector for food security, nutritional security, sustainable development and poverty alleviation. It contributes approximately 15% of the GDP in India, with the potential to contribute more. In this context, e-technologies such as artificial intelligence (AI), machine learning (ML), remote sensing, big data, block chain and IoT, are transforming agricultural value chains and modernizing operations.

The **benefits of e-technology for Indian farmers are**:

- **Improved decision-making:** By having the necessary information, farmers make improved decisions concerning their agricultural activities based on various factors. For instance, weather advisories help the farmers to sow the seeds at relevant time to enhance productivity.
- **Better planning:** E-technology helps to continuously monitor the land so that precautions can be taken at an early stage. It increases productivity, reduces manual work, reduces time and makes farming more efficient. For instance, **big data** collected through mobile imaging, satellite imagery, drone patrolling, GPS / RFID is useful in better planning of available resources like water.
- **Community involvement:** There are several programmes which are made possible by IT applications which promote community involvement in agriculture. With the application of IT, there can be better coordination among the local farmers. This will further lead to improved crop productions facilitating better farm income.
- **Agricultural breakthroughs:** E-technology makes the spread of information concerning the latest agricultural breakthroughs more possible. Sharing information regarding new technologies and inventions to help everyone progress is made easier through resources made available and accessible by IT.

The following steps have been taken by the government towards use of e-technology in agriculture:

- **AGMARKNET**: This e-governance portal facilitates generation and transmission of prices, commodity arrival information from agricultural produce markets, and web-based dissemination to producers, consumers, traders, and policymakers transparently and quickly.
- **Kisan Suvidha app:** It is an omnibus smartphone app that helps farmers by providing them relevant information regarding weather, dealers' market prices, plant protection, agro advisories, IPM practices etc.
  - Various other apps have been launched such as **AI-Sowing app** for optimal date of seed sowing, **Crop Insurance app** to calculate insurance premium, **Agri Market app** for information of market price of all crops within a 50-kilometre radius, **Pusa Krishi app** for information about various crops etc.
- **Bhuvan platform**: ISRO's geo platform, Bhuvan provides valuable data on plantation, pest surveillance and weather.
- **Direct benefit transfer (DBT) Central Agri Portal**: It is a unified central portal for agricultural schemes across the country to help farmers adopt modern farm machineries through government subsidies.
- **e-NAM**: The National Agriculture Market scheme envisages initiation of e-marketing platforms at the national level and supports creation of infrastructure to enable e-marketing in regulated markets across the country.
- **Unified Farmer Service Platform (UFSP)**: It is a combination of Core Infrastructure, Data, Applications and Tools that enables seamless interoperability of various public and private IT systems in the agriculture ecosystem across the country.

Further measures are required to address lack of awareness, establish digital infrastructure in rural areas, overcome digital divide and encourage adoption of e-technologies to ensure increased agricultural productivity and income.

12. *Discuss the various issues that hinder the development of the port infrastructure in India and state the recent measures taken by the government to address the same.*

Approach:

- Highlight the importance of port infrastructure.
- Mention the various issues confronting the development of port infrastructure in India.
- Suggest the measures taken up by the government in addressing the same.
- Conclude accordingly.

Answer:

India, having a coastline of more than 7500 kilometres, is serviced by 13 major ports and more than 200 notified minor and intermediate ports. The Economic Survey 2021-22 has called for improved port governance and augmentation as one of the key drivers of the infrastructure sector and a necessary vehicle for social and economic transformation.

However, many **issues and impediments have hindered the development of the port infrastructure** in India, which include:

- **Financial constraints:** Underinvestment and poor financing have led to inadequate port infrastructure. This has also been one of the reasons for the dismal condition of ports, especially the non-major ports.
- **Limited private sector involvement:** The financial viability of port projects is a major deterrent for private developers as well as financiers. Greenfield port projects are usually in remote locations and considerable government level support is required to create basic infrastructure for site access.
- **Regulatory issues:** Major and non-major ports fall under different jurisdictions and the regulatory framework is also rigid. Further, there have been constraints in port infrastructure development due to land acquisition issues and delayed environmental clearances.
- **Infrastructure bottlenecks:** The high turnover time and pre berthing time, and freight costs make Indian ports less competitive. For example, in Singapore, the average ship turnaround time was less than a day and in India, it was just over two days.
- **Old docks and terminals:** There have been issues related to poor maintenance of old ports and lack of efforts for their upgradation.

With the acknowledgement of the crucial role of the port infrastructure modernisation and augmentation, following measures have been undertaken by the government:

- The **Sagarmala project**, which aims to modernize India's ports so that port-led development can be augmented and coastlines can be developed to contribute to India's growth.
- In 2016, India passed the **Central Port Authority (CPA) Act,** which grants more autonomy to the major ports.
- The **Revised Model Concession Agreement (MCA)** provides incentives for the private sector to get involved in port development. The government provides a **10-year-tax holiday** to companies that help maintain and operate ports.
- The **Major Port Authorities Act, 2021,** provides for regulation, operation and planning of major ports in India by vesting their administrative control on the boards of major ports authorities.
- A **new captive policy for port-dependent industries** has been prepared to address the challenges of renewal of concession period, the scope of expansion and creating a dynamic business environment.
- Initiatives to **enhance Ease of Doing Business** include implementing **Enterprise Business System (EBS)** to simplify and digitize processes across Major Ports by 2021 and developing **National Logistics Portal (Marine).**

The country's marine sector is intricately linked to economic trade and competitiveness. The **Maritime Indian Vision 2030** is a step in the right direction to enhance the port infrastructure and give the necessary impetus for rapid and efficient expansion of India's port sector.

13. ***The National Rail Plan (NRP) for India – 2030 seeks to create a 'future ready' railway system by 2030. Discuss.***

Approach:

- Write a short introduction on the National Rail Plan (NRP).
- Discuss how the NRP will help create a future ready railway system by 2030.
- Conclude appropriately.

Answer:

The Indian Railways have prepared a **National Rail Plan (NRP)** to create a 'future ready' railway system by 2030. The NRP is aimed to formulate strategies based on both operational capacities and commercial policy initiatives**.** It seeks to **create capacity ahead of demand**, which in turn, would also cater to **future growth in demand right up to 2050.**

The National Rail Plan seeks to **create a 'future ready' railway system by 2030 in the following ways**:

- Formulating of strategies based on both **operational capacities** and **commercial policy initiatives** to **increase the modal share of the Railways in freight to 45%**.
- **Reducing transit time of freight** substantially by increasing average speed of freight trains to 50Kmph.
- Under the plan**, Vision 2024** has been launched for **accelerated implementation of certain critical projects by 2024** such as 100% electrification, multi-tracking of congested routes, upgradation of speed to 160 kmph on Delhi-Howrah and Delhi-Mumbai routes, upgradation of speed to 130kmph on all other Golden Quadrilateral-Golden Diagonal (GQ/GD) routes and elimination of all Level Crossings on all GQ/GD route.
- Identifying new **Dedicated Freight Corridors** and **High Speed Rail Corridors**.
- **Assessing rolling stock requirement** for passenger traffic as well as **wagon requirement** for freight.
- **Assessing locomotive requirement** to meet twin objectives of **100% electrification** (Green Energy) and **increasing freight modal share**.
- **Assessing the total investment in capital** that would be required along with a periodical break up.
- **Sustained involvement of the private Sector** in areas like operations and ownership of rolling stock, development of freight and passenger terminals, development/operations of track infrastructure etc.
- Complete executable **gauge conversion** projects.
- **58 Super critical Projects and 68 Critical Projects** have been identified for **completion by 2024**.

In the historical evolution of the Railways in India, the emphasis has largely been on passengers and not on freight. The NRP seeks to rectify this bias, and develop a capacity that will cater to demand in 2050. In comparison with the earlier Committee reports that mainly concentrated on policy issues and operational constraints, the NRP includes a detailed analysis of the existing network as well. Furthermore, the NRP seeks to make decisions around new tracks and investments more objective, which were previously often driven by political considerations and were ad hoc in nature.

14. ***What are Infrastructure Investment Trusts (InvITs)? Discuss their significance in India's growth and development.***

Approach:

- Introduce by defining Infrastructure Investment Trust (InvITs).
- Elaborate on the features of InvITs.
- Highlight their significance in India's growth and development.
- Conclude appropriately.

Answer:

Infrastructure Investment Trusts (InvITs) are **collective investment vehicles similar to a mutual fund**, which enables direct investment of money from individual and institutional investors in infrastructure projects to earn a small portion of the income as return. In India, InvITs are governed by SEBI (Infrastructure Investment Trusts) (Amendment) Regulations, 2016.

The following are the key features of InvITs:

- InvITs are designed as a **tiered structure with a sponsor setting up the InvIT,** which in turn, invests into the eligible infrastructure projects either directly or via special purpose vehicles (SPVs).
- These long-term revenue-generating infrastructure assets, in turn **generate cash flows, which are then distributed to the unitholders periodically.**
- InvITs are a **hybrid between equity and debt investment**, i.e., it has features of both equity and debt.
- Public InvIT units can be listed and **traded on a stock exchange like equity stocks**.
- For example, National Highways Authority of India's (NHAI's) InvIT is a **trust established under the Indian Trust Act, 1882** and **Securities and Exchange Board of India (Infrastructure Investment Trusts) Regulations, 2014**.

Significance of InvITs for India's growth and development:

- **Infrastructure creation:** InvITs spur infrastructure creation by providing an efficient way to raise capital from investors – individual and institutional and fund new projects for development.
- **Predictable and stable capital:** InvITs help the infrastructure developers to recycle capital locked in long-term infrastructure projects such as roads, transmission lines or renewable assets.
- **Attract foreign investment**: InvITs attract the interest of foreign investors especially pension funds, sovereign wealth funds and insurance companies.
- **Low risk**: As per the SEBI regulations, InvITs must invest at least 80% of their assets in projects that are completed and revenue-generating. InvITs cannot invest more than 10% of their assets in under-construction projects.
- **Robust corporate governance:** Regulatory framework built around InvITs incorporates corporate governance, stable long-term returns because of mandatory distribution rules, lower risks, and tax benefits on income distributions.
- **High quality assets**: InvITs house long-term infrastructure assets with superior credit quality and low demand and price-related risks, i.e., assured annuity cash flows (pre-regulated cash flows every year) such as power transmission, renewable, telecom towers, roads, and gas distribution.

Despite multiple benefits associated with the InvITs, there are associated risks related to their operation, refinancing, regulation and return. Considering the fact that infrastructure development is pertinent for India's growth and development, there is a need to address the associated risks.

15. What are Development Financial Institutions? Discuss the challenges faced by these institutions in India.

Approach:

- Explain Development Financial institutions in the introduction.
- Discuss the challenges faced by Development Financial institutions in India.
- Conclude by mentioning the steps required to address these challenges.

Answer:

Development Financial institutions (DFI) are institutions that provide long-term development finance to various sectors like industry, agriculture, housing and infrastructure. The Industrial Finance Corporation of India (IFCI) was the first DFI set up after independence in 1948, followed by IDBI, NABARD, EXIM Bank, SIDBI, etc. DFIs can be either wholly or partially owned by the government and few have majority private ownership, determined by the nature of the activities being financed, and their associated risk-returns profile.

Challenges faced by Development Financial institutions in India:

- **Attracting and retaining the best staff**: DFIs are in **competition with the private sector** to attract talent. They are often at a disadvantage when it comes to absolute levels of remuneration. This may erode efficiency, motivation and competence.
- **Actionable strategy**: DFIs are expected to operate at the forefront of societal and economic change and need a strategy to guide them towards meeting their objectives. This becomes more difficult due to the nature of their governance, which is often **complex and prone to political interference.**
- **Credit decisions**: Avoiding a **high level of non-performing loans** is as important for DFIs as it is for commercial banks. Moreover, making good credit decisions has other dimensions and faces specific challenges like underwriting weak loans for the sake of volume targets and corruption.
- **Counter-productive competition**: With respect to resource allocation, there are cases of too much money chasing too few good projects, resulting in poor resource allocation and counter-productive competition.
- **Balance between private and public sectors**: A DFI with a private sector character will require the government to believe and trust the private sector and still extend such benefits to the institution as it would normally to a state-owned DFI.
- **Lack of a sustainable source of funds:** Subsidised credit from the government and the Reserve Bank of India (RBI) has not proved to be a sustainable source in the past. Lack of sustainable source of funds can prove to be a serious constraint to the proposed DFIs.
    - Moreover, maintaining the cost advantage over a period of time is also a challenge, as the resources raised would have a fixed (specified) coupon with long maturity, which may not be flexible.

Considering the challenges being faced by the DFIs, steps like **establishment of standardised and streamlined regulatory frameworks**, advocating **performance-based remuneration** to retain staff and **vocational training** to keep the technical competence and maintain efficiency of DFI, need to be undertaken. Also, **consultation and coordination among DFIs** should be encouraged to make sure that overlaps are avoided and eventual market gaps are covered. Further, there is a need of **cultivating a strong culture of innovation** to increase value-addition and catalyse private investment. **Allowing DFI to raise long-term financing from external markets and from multilateral financial institutions** would also go a long way towards the success of DFIs.

16. What is Design Linked Incentive (DLI) scheme? Discuss how this scheme can create a difference in the semiconductor manufacturing industry in India.

Approach:

- Briefly discuss the Design-linked incentive (DLI) scheme.
- State the benefits of this scheme for the semiconductor manufacturing industry in India.
- Briefly mention some associated challenges and conclude accordingly.

Answer:

The Ministry of Electronics and Information Technology has announced the Design Linked Incentive (DLI) Scheme to offset the disabilities in the domestic industry involved in semiconductor design in order to not only move up in value-chain but also strengthen the semiconductor chip design ecosystem in the country.

It aims to offer financial incentives as well as design infrastructure support across various stages of development and deployment of semiconductor design(s) for Integrated Circuits (ICs), Chipsets, System on Chips (SoCs), Systems & IP Cores and semiconductor linked design(s) over a period of 5 years.

This scheme can create a difference in the semiconductor manufacturing industry in India in the following ways:

- **Promoting R&D**: It will provide funds for R&D under rising development costs and fulfil the needs of design that requires 12-20% of company sales back into R&D.
- **Establishing semiconductor ecosystem**: It will help to create a vibrant semiconductor ecosystem, helping in development of modern complex chips, often leveraging external IP and design support services.
  - It aims to set up the **India Chip Centre** to host the state-of-the-art design infrastructure and facilitate its access to supported companies.
- **Financial support**: It aims to provide financial support to companies setting up fabs or semiconductor making plants in India.
  - Under this scheme, a reimbursement of up to 50% of the eligible expenditure subject to a ceiling of Rs.15 Crore per application will be provided as fiscal support to the approved applicants who are engaged in semiconductor design.
  - Further, incentives would be provided to applicants whose semiconductor design and semiconductor linked design are deployed in electronic products.
- **Increase competition**: The scheme will **attract existing and global players** as it will support their expenditures related to design software, IP rights, development, testing and deployment. This will **encourage innovation** in India apart from avoiding dependencies on a few countries or companies.
- **Increased capacity**: The increased capacity of the semiconductor sector will spur demands from other sectors such as transportation, energy, agriculture etc. which will in turn fuel development of the semiconductor industry.
- **Access to larger markets**: This scheme will help domestic companies to become part of the **global value chain**, thereby providing access to larger global markets.

Considering these contributions, this scheme would add to economic strength and contribute towards the creation of a US$1 trillion digital economy with a multiplier effect to achieve a US$5 trillion economy by 2025 provided certain challenges such as rapid changes in technology, high competition, specialisation and expertise, threats to supply chain etc. are addressed. Thus, there is a need to promote research, strengthen the supply chain, improve the patent ecosystem, etc, to realise the true potential of the scheme. The DLI scheme along with the Production-Linked Incentive (PLI) scheme have a crucial role in shaping India as an **efficient, equitable, and resilient design and manufacturing hub**.

17. Evaluate the role of Pradhan Mantri Jan-Dhan Yojana in ensuring financial inclusion in India.

Approach:

- Write about Jan-Dhan Yojana in introduction.
- Write the role played by the scheme in creating financial inclusion in India.
- Conclude accordingly.

***Answer*:**

Pradhan Mantri Jan Dhan Yojana (PMJDY) is a **National Mission on Financial Inclusion** encompassing an integrated approach to bring about comprehensive financial inclusion of all the households in the country. The plan envisages universal access to banking facilities with at least one basic banking account for every household, financial literacy, access to credit, insurance and pension facility.

Role of Pradhan Mantri Jan-Dhan Yojana in ensuring financial inclusion in India:

- **Opening Bank accounts**: PMJDY has brought the unbanked into the banking system, expanded the financial architecture of India and brought financial inclusion to almost every adult. As per government data, 55% Jan-Dhan account holders are women and 67% Jan Dhan accounts are in rural and semi-urban areas
- **Access to Government schemes**: PMJDY has been the foundation stone for people-centric economic initiatives. It has ensured a bank account for every adult which is required to get benefits of schemes like COVID-19 financial assistance, PM-KISAN, increased wages under

MGNREGA, life and health insurance cover. Under PM Garib Kalyan Yojana, a total of Rs. 30,945 crore have been credited in accounts of women PMJDY account holders during Covid lockdown.

- **Formal Financial System: Pradhan Mantri Jan-Dhan Yojana** provides an avenue to the poor for bringing their savings into the formal financial system, an avenue to remit money to their families in villages besides taking them out of the clutches of the usurious money lenders.
- **Prevent Systemic leakages**: In today's COVID-19 times, there is witnessed a remarkable swiftness and seamlessness with which Direct Benefit Transfer (DBTs) have empowered and provided financial security to the vulnerable sections of society. An important aspect is that DBTs via PM Jan Dhan accounts have ensured every rupee reaches its intended beneficiary and prevent systemic leakage. About 5.1 crore PMJDY account holders receive direct benefit transfer (DBT) from the Government under various schemes and because of PMJDY, the percentage of total DBT failures has decreased from 13.5% (FY 19-20) to 5.7% (FY 20-21).

Going forward, there is a need to **move from financial inclusion to financial empowerment** by providing credit. The PMJDY should become **PM Jan Dhan Vridhi Yojana** with universal access to bank credit to the most underprivileged sections of the society. Also, infrastructure needs to be cost effective and there is a need to build up a database to capture the income transaction history of the Jan Dhan account holders on the basis of which credit delivery models can be worked out.

18. *What are the sources of human capital? Highlight the role that human capital plays in the economic growth of a country.*

Approach:

- Define human capital in the introduction.
- Discuss the various sources of human capital.
- Highlight the role of human capital in economic growth.
- Conclude accordingly.

Answer:

Human capital refers to the economic value of a worker's experience and skills. It includes assets like education, training, intelligence, skills, health, and other things employers value such as loyalty and punctuality.

Sources of Human Capital:

- **Investment in education:** Just as companies invest in capital goods with the objective of increasing future profits over a period of time, individuals invest in education with the objective of increasing their future income.
- **Health:** A sick labourer without access to medical facilities is compelled to abstain from work and there is loss of productivity. Health expenditure directly increases the supply of a healthy labour force and is, thus, a source of human capital formation.
- **On the job training:** Firms incur some expenses on the training of their employees. After that they insist that the workers should work for a specific period of time during which they can recover the benefits of the enhanced productivity owing to the training.
- **Expenditure on migration:** Migration involves cost of transport, higher cost of living in the migrated places and psychic costs of living in a strange socio-cultural setup. However, the enhanced earnings in the new place outweigh the costs of migration.
- **Information:** Information is necessary to make decisions regarding investments in human capital as well as for efficient utilization of the acquired human capital stock. Expenditure incurred for acquiring information relating to the labour market and other markets is also a source of human capital formation.

Human capital and economic growth:

- Economic growth means the increase in real national income of a country. The contribution of an educated person to economic growth is more than that of an illiterate person. Similarly, because a healthy person can provide **uninterrupted labour supply** for a longer period of time, health is also an important factor for economic growth. Thus, both education and health, along with many other factors like on-the-job training, job market information and migration, increase an **individual's income generating capacity,** which contributes to economic growth.

- Human capital contributes substantially not only towards increasing **labour productivity** but also **stimulates innovations** and creates the ability to absorb new technologies. Education provides knowledge to understand changes in society and scientific advancements, thus, facilitate inventions and innovations. Similarly, the availability of an educated **labour force facilitates adaptation to new technologies.**
- Human capital formation will lead to a high rate of participation of people in **economic activities** and thus will reduce the gap between the poor and the rich, thus reducing inequality. It further helps in **improving the quality of life**.

However, while the human capital growth in developing countries has been faster but the growth of **per capita real income has not been that fast**. There are reasons to believe that the **causality between human capital and economic growth flows in either direction**, i.e., higher income causes the building of a high level of human capital and high level of human capital causes growth of income.

19. Highlight the differences between cropping pattern and cropping system. Also, discuss the various types of cropping systems practiced in India.

Approach:

- List the differences between cropping pattern and system.
- Mention the various cropping patterns in India.
- Conclude accordingly.

Answer:

Cropping pattern refers to the proportion of area under different crops at any given point of time in a unit area. It indicates the temporal and/or spatial arrangement of crops in a particular area. Whereas, **cropping system** is a broader term than cropping pattern and includes the sum total of all crops and the practices used to grow those crops on a field or farm. It comprises all components, such as water, soil, technology etc. required for the production of a particular crop and the interrelationships between them and the surrounding environment.

Differences between Cropping pattern and Cropping systems:

Cropping Pattern	**Cropping System**
Includes crop rotation practiced by a majority of farmers in a given area or locality.	Includes cropping pattern and its management to derive benefits from a given resource base under specific environmental conditions.
Type and management of crops through temporal arrangement i.e. yearly sequence of growing different crops on a piece of land. Also management is done through spatial arrangement i.e. arrangement of crops on a piece of land in various patterns.	The cropping patterns used on a farm and their interaction with farm resources, other farm enterprises and available technology which determine their make-up.

Types of cropping systems practiced in India:

- **Mono Cropping:** It refers to growing only one crop on a piece of land year after year. It may be due to climatic and socio-economic conditions or due to specialisation of a farmer in growing a particular crop. For e.g. groundnut or cotton or sorghum are grown year after year due to limitation of rainfall while under waterlogged condition, rice crop is grown as it is not possible to grow any other crop.
- **Multiple Cropping:** It is the practice of growing two or more crops in the same field within a given year. It includes
    - **Mixed-cropping:** Two or more crops grown in the same field within a given year without a definite row arrangement. Sorghum, pearl millet and cowpeas are mixed and broadcasted in rain-fed conditions.

- **Inter-cropping:** It includes growing two or more crops simultaneously with definite row arrangement on the same field with an objective of higher productivity per unit area in addition to stability in production. Example is that of maize plus greengram or blackgram.
- **Sequence cropping:** It can be defined as growing two or more crops in a sequence on the same piece of land in a farming year. The succeeding crop is planted after the preceding crop has been harvested. Example: Tomato- rice- pulse or rice-cotton.

- **Other types of Cropping:**
  - **Alley Cropping:** It is planting rows of trees at wide spacing with a companion crop grown in the alleyways between the rows. The trees may include valuable hardwood veneer or lumber species; fruit, nuts etc.
  - **Relay Cropping:** Growing two or more crops simultaneously during the part of the life cycle of each. In India, Rice –cauliflower – onion-summer gourd is one example of relay cropping.
  - **Ratoon Cropping:** Crop regrows out of roots or stalks which were left after harvest of crops. Besides sugarcane, ratooning is also practiced commercially in many other crops including banana, cotton etc.

Cropping patterns and systems are mostly affected due to agronomic factors, economic factors and policy-related factors. Over the last few decades the stress over agriculture has hinted that the cropping pattern and system needs to be reformed based on agriculture zones.

20. Discuss the potential impact of climate change on Indian agriculture. What steps have been taken by the government in this regard?

***Approach**:*

- Give a brief introduction about the contribution of agriculture to the Indian economy .
- Discuss the impact of climate change on Indian agriculture.
- Highlight the steps taken by the government in this regard.
- Conclude accordingly.

***Answer**:*

Agriculture contributes around 15 per cent to India's GDP, and scientists believe that climate change will reduce agricultural productivity and it may presumably lead to loss of around 1.5% of GDP.

Impact of climate change on Indian agriculture will be as follows:

- According to **National Innovations in Climate Resilient Agriculture (NICRA)**, the fall in agricultural productivity due to climate change will lead to reduction in rice, wheat and maize yields.
- There will be an **unpredictable change in pest and disease load**. There is also the possibility of minor pests becoming major pests with changing climatic conditions.
- **Increased frequency and intensity of extreme weather events** such as droughts, floods and cyclones would affect the production levels more than the impact of mean changes in the climate.
- **Vegetable crops,** when exposed to extreme high temperatures, are subject to very high transpiration losses, and it also limits fruit setting in citrus fruits. Also, heat stress due to higher temperature at critical stages of the crop growth will impact productivity.
- **There will be a rise in productivity** of a few crops like **chickpea, soyabean, gram, potato, etc.** due to higher levels of carbon dioxide in the atmosphere.

Not only agriculture but climate change will also affect the allied sectors like poultry, fishing etc. Thus, climate and agriculture are intensely interconnected.

Initiatives taken by the government to combat the effects of climate change on agriculture include:

- **The Indian Council of Agricultural Research (ICAR)** has initiated a project **NICRA (National Innovations in Climate Resilient Agriculture)** to provide strategic research on adaptation and mitigation, demonstration of technologies on farmers' fields and creating awareness among farmers and other stakeholders to minimize the impacts of global warming on agriculture.

- For instance, under this project, a large number of indigenous genetic resources and improved crop varieties of pulses (black gram, green gram, pigeonpea, chickpea) and cereals (rice and wheat) are screened for major abiotic stresses like drought and heat to identify superior cultivars for large scale adoption.
- Location-specific National Resource Management (NRM) technologies are being demonstrated under the Technology Demonstration Component of NICRA in 151 climatically vulnerable districts to achieve climate resilient agriculture. **District Agriculture Contingency Plans** have been prepared by ICAR-CRIDA, Hyderabad for 648 districts in the country to address the adverse weather conditions.

* **The National Mission for Sustainable Agriculture (NMSA)**, one of the missions under National Action Plan on Climate Change (NAPCC), aims to evolve and implement strategies to make Indian agriculture more resilient to the changing climate.
* **The National Food Security Mission (NFSM)** is implemented in the identified districts across the country with the objective of increasing food-grain production through area expansion and productivity enhancement, restoring soil fertility and productivity at individual farm level and enhancing farm level economy.
* **The National Adaptation Fund** for climate change supports concrete adaptation activities dealing with mitigation of the adverse effects on agriculture.

Other measures like **Green India Mission (GIS), National Water Mission (NWM)** etc. have also been taken. Thus, considering the impacts of agriculture to the Indian economy and food security, there is an urgent need to boost the efforts from all the stakeholders to reduce the impacts of climate change on agriculture.